

Trace Metals in Water by ICP-AES EPA 200.7 Revision 4.4						Page 1 of 4
Facility Name: _____ VELAP ID _____						
Assessor Name: _____ Analyst Name: _____ Inspection Date _____						
Relevant Aspect of Standards	Method Reference	Y	N	N/A	Comments	
Records Examined: SOP Number/ Revision/ Date _____ Analyst: _____						
Sample ID: _____ Date of Sample Preparation: _____ Date of Analysis: _____						
For total recoverable elements, are samples not filtered and acidified with nitric acid to pH <2 within two weeks of collection?	8.3					
For total recoverable elements, is the pH of all aqueous samples verified to be pH <2 at least 16 hours after preservation and prior to withdrawing an aliquot for processing? If pH is >2, more acid is added and sample is held for another 16 hours before recheck. <i>ONLY ENFORCED FOR DRINKING WATER, per the CFR.</i>	8.3, 40 CFR 141.23 k.1					
For dissolved elements, are samples filtered through a 0.45 µm pore diameter membrane filter at collection or soon after? Filtrate is acidified with nitric acid to pH <2.	8.2					
Are solid samples stored at 4°C until time of analysis?	8.4					
Are solids and aqueous samples that may contain particulates digested or extracted prior to analysis? (This does not apply to drinking water samples with turbidity <1 NTU unless being analyzed for silver.)	1.5 1.4					
For boron and silica in aqueous samples, are only plastic or quartz labware used from sample collection through analysis?	1.6					
For silver in samples containing more than 0.1 mg/L silver, are samples diluted prior to analysis until <0.1 mg/L?	1.7					
For total recoverable digested samples, are calibration standard solutions prepared using the following proportions? The appropriate volumes of stock solutions are combined in 500 mL volumetric flasks with 20 mL (1+1) HNO ₃ and 20 mL (1+1) HCl and diluted to volume with reagent water.	7.9					
Is the calibration blank prepared using the same amounts of acids as used for the standards?	7.10.1					
Notes/Comments:						

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Relevant Aspect of Standards	Method Reference	Y	N	N/A	Comments
Is a laboratory reagent blank carried through the same entire preparation as the samples with each batch of 20 or fewer samples of the same matrix? (The digestion can be omitted for direct analysis of drinking water.)	7.10.2, 9.3.1, 11.4.6				
Is a laboratory fortified blank containing all the analytes of interest carried through the same entire preparation as the samples, with every batch of samples? Acceptable recovery range is 85-115%. (The digestion can be omitted for direct analysis of drinking water.)	7.10.3, 9.3.2, 11.4.6				
Is the rinse blank prepared in the same acid mixture as the calibration standards?	7.10.4				
Is the instrument performance check solution prepared in the same acid mixture as the calibration standards, and is it prepared using the same stock solutions as the calibration standards? Silver is limited to 0.5 mg/L.	7.11				
Is a quality control sample obtained from an outside source analyzed to meet data-quality needs? The sample must contain at least 1 mg/L for all analytes except silver, which is limited to 0.5 mg/L. The determined mean from three analyses of the QCS must be within $\pm 5\%$ of the stated values.	7.12, 9.2.3				
Are interelement corrections periodically performed using spectral interference check solutions, or is the absence of spectral interference periodically documented?	7.13, 7.14, 9.3.5				
Is an interelement spectral interference correction routine established and verified prior to sample analysis?	10.4				
Is linear dynamic range correctly determined for each wavelength utilized at least annually?	9.2.2				

Notes/Comments:

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Relevant Aspect of Standards	Method Reference	Y	N	N/A	Comments
If a wavelength other than a recommended wavelength is used, has the analyst determined and documented both on-line and off-line spectral interferences for all method analytes, and is the analyst utilizing an automatic correction routine?	10.1				
Are method detection limits established at least annually for all wavelengths utilized using seven replicate aliquots which are processed through the entire analytical method?	9.2.4				
Are instrument performance check (IPC) solutions and a calibration blank analyzed immediately following daily calibration, at least after every 10 th sample, and at the end of the sample run? The IPC immediately following calibration must be within $\pm 5\%$ of calibration; subsequent IPCs must be within $\pm 10\%$ of calibration.	9.3.4				
Is a known amount of each analyte spiked into a duplicate aliquot sample for at least 10% of samples? Are spiked samples carried through the same entire preparation as the samples? For total recoverable metals, spikes must be added prior to sample preparation. Acceptable percent recovery is 70-130%.	9.4.2				
For dissolved analytes, is acid added to the sample in a ratio of 0.4 mL (1+1) HNO ₃ to 20 mL sample, and mixed?	11.1.1				
Is the hot plate located in a fume hood and previously adjusted to provide evaporation at a temperature of approximately but no higher than 85°C?	11.2.3				
For total recoverable metals, are samples containing undissolved solids >1% evaporated to near 10 mL and then extracted for 30 minutes using 4 mL of (1+1) HNO ₃ and 10 mL of (1+4) HCl?	11.2.2, 11.3.3-11.3.6				
For total recoverable metals, are samples containing undissolved solids <1% digested using a ratio of 2 mL (1+1) HNO ₃ and 1 mL (1+1) HCl into 100 mL of sample? (Smaller aliquots may be used if acids are reduced accordingly.)	11.2.2, 11.2.3				
Notes/Comments:					

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For total recoverable metals, are samples covered with an elevated (ribbed) watch glass, evaporated to about 20 mL, and then covered with a plain (non-ribbed) watch glass for a 30-minute reflux?	11.2.4, 11.2.5				
Are cooled samples diluted to 50 mL with reagent water?	11.2.6				
Is the instrument allowed to become thermally stable before calibration and analysis? (Allow at least 30 to 60 minutes.)	11.4.3				
Is a peristaltic pump used to introduce all samples to the nebulizer, and are solutions aspirated for 30 seconds after reaching the plasma?	11.4.4				
Is the system flushed with a rinse blank for at least 60 seconds between each standard or sample?	11.4.4, 11.4.5				
For total recoverable metals, is the result multiplied by the dilution factor 0.5 when a 100 mL aliquot is used to produce a 50 mL final solution? If a different aliquot volume is used for sample preparation, the dilution factor is adjusted accordingly.	12.3				
If sample analyte concentrations that are greater than 90% of the upper LDR limit, are the samples diluted and reanalyzed or determined by another approved method?	9.2.2				
Does the laboratory understand that this method may NOT be used to report drinking water compliance data for Arsenic, Antimony, Lead Selenium or Thallium?	40 CFR 141				
Do the analytical records include the identification of any standards, acids, reagents, solutions, etc. used in the analysis and preparation of the samples?	EPA 815-R-05-004 Ch. IV.8.4				
Notes/Comments:					